



UNITED STATES PATENT AND TRADEMARK OFFICE

du

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,459	11/03/2003	Paul R. Labute	6824-1	3455

39196 7590 07/05/2006

SHLESINGER, ARKWRIGHT & GARVEY LLP
1420 KING STREET
SUITE 600
ALEXANDRIA, VA 22314

EXAMINER

WHALEY, PABLO S

ART UNIT PAPER NUMBER

1631

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/699,459	LABUTE, PAUL R.	
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 4-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/03/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

APPLICANT'S ELECTION

Applicant's election without traverse of Species A ("Bayes Theorem" as recited in instant Claim 2) in the reply filed on 04/17/2006 is acknowledged. Although applicant stated that the election was made without traverse, he nonetheless argued that search and examination of all claims (species) would not be burdensome to the examiner. In response, it is noted that a search of any single species requires a search of nonpatent literature and foreign patents as well as US patents and published applications. As the species set forth in the election requirement of 3/16/06 are distinct and do not overlap, the examiner maintains that a search of more than a single species would be burdensome. The requirement is still deemed proper and is therefore made FINAL. Claims 4-11 are hereby withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention or species, there being no allowable generic or linking claim.

CLAIMS UNDER EXAMINATION

Claims herein under examination are Claims 1-3 as they read on the elected species. An action on the merits follows.

ABSTRACT

The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

INFORMATION DISCLOSURE STATEMENT

Art Unit: 1631

The information disclosure statement filed 11/03/2003 has been considered in full.

CLAIM REJECTIONS - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-3 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. Claims 1-3 are directed to a computer-based method of “generating a quantitative structure” that do not recite either a physical transformation of matter nor a practical application. Claim 1 recites steps of “calculating” a numerical representation of molecules and “estimating” a probability distribution. The specification does not define these steps such that any step is necessarily a physical step. Computer-based processes may be statutory where they recite a concrete, tangible, and useful result (i.e. a practical application). However, no actual, concrete result is recited in the claims, nor is any useful result “produced” in a tangible form useful to one skilled in the art. For the reasons set forth above, the claims are not statutory. For an updated discussion of statutory considerations with regard to non-functional descriptive material and computer-related inventions, see the Guidelines for Patent Eligible Subject Matter at 1300 OG 142, Annex IV, Nov. 22, 2005.

CLAIM REJECTIONS - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "*n* numbers per molecule". It is unclear whether "*n* numbers per molecule" is referring to numerical representations, structures, or something else. Clarification is requested.

Claim 1 recites the limitation "*a* said molecules is active". It is unclear whether the "*a*" is intended to refer to "one" of the "said molecules" as being active, or whether "*a*" is intended represent a variable number of the "said molecules" as being active. Clarification is requested.

The preamble of claim 1 recites a method of generating a QSAR. However, as there are no steps directed to generating a QSAR, it is unclear in what way the steps of instant claim 1 achieve the purpose of the preamble. Clarification is requested. It is noted that instant claim 1 results in the step of "estimating the probability distribution that a said molecule is active."

CLAIM REJECTIONS - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C.102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102 (b) as being anticipated by Lawrence et al. (Proteins: Structure, Function, and Genetics, 1992, Vol. 12, p. 31-41).

Lawrence et al. teach a computer-based search algorithm for finding novel ligands capable of binding proteins of known 3-D structure [Abstract]. More specifically, Lawrence et al. teach the following aspects of the instant invention:

- Generation of atomic coordinates of a given candidate molecule consisting of n_t atoms [p.33, Col. 1, ¶ 4], which is a teaching for numerical representations of molecules as in instant claim 1.
- Determination of small molecules that achieve a high likelihood of favorable interaction (i.e. binding activity) based on energy distributions [p.35, Col. 2, ¶ 1 and ¶ 2], which correlates to estimating a probability distribution that said molecule is active as in instant claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being made obvious by Hahn et al. (J. Med. Chem., 1995, Vol. 38, p. 2091-2102), in view of Bretthorst et al. (In Maximum Entropy and Bayesian Methods, P.F. Fougere, 1990, Kluwer Academic Publishers, The Netherlands, p.1-27).

Hahn et al. teach a technique for using receptor surface models in quantitative structure-activity relationship (QSAR) analysis [Abstract]. More specifically, Hahn et al. teach the following aspects of the instant invention:

- Quantitative descriptors that capture 3-D information about receptor/ligand interactions [Abstract], which is a teaching for “numerical representations” of molecules as in instant claim 1.
- Analysis techniques using large numbers of descriptors [p.2091, Background]; RSM (receptor surface model) with numerical descriptors (E_{interact} and E_{strain}) for 31 compounds [Table 1], which suggests the estimation of “n” numbers of descriptors per molecule as in instant claim 1.

- Estimation of activity of compounds using cross-validation and randomization testing (i.e. probability distribution) [p.2100, Col. 1, ¶ 3 and 4], and histogram of randomization test results [Fig. 12], which correlates to a probability distribution as in instant claim 1 (b).
- Predictive modeling of activity of candidate compounds [Fig. 5, and p.2095, Col. 2, ¶ 2], as in instant claim 1.
- Computer-based method [p.2101, Section 5], as in instant claim 1.

Hahn et al. do not specifically teach Bayes Theorem and n one-dimensional distributions, but do suggest randomization testing based on estimation of random variables [p.2100, Col. 2, ¶ 3 and ¶ 4].

Bretthorst et al. teach method of parameter estimation using Bayesian Probability Theory [Abstract]. More specifically, Bretthorst et al. teach estimation of probability distributions using Bayes Theorem [Section 2], and estimation of probability distribution comprising m one-dimensional distributions [Equation (7)], as in instant claims 2 and 3.

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the quantitative structure-activity relationship (QSAR) analysis method of Hahn et al. with the Bayesian parameter estimation method of Bretthorst et al., where the motivation would have been to estimate the distribution of random parameters within an ensemble of parameters et al. (Bretthorst, p.1, Introduction). One of ordinary skill in the art would have had a reasonable expectation of successfully combining the computer-based method of Hahn et al. and statistical estimation technique of Bretthorst et al. as both teach statistically based techniques for estimations of random variables.

Art Unit: 1631

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel can be reached on (571)272-0718. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Pablo S. Whaley

Patent Examiner
Art Unit 1631
Office: 571-272-4425

MARJORIE A. MORAN
PRIMARY EXAMINER

Marjorie A. Moran
6/26/06